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For Mr. Coffman.
Please return.

Trinity
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Forest Insect Field Station 5
Yreka, California, March 9, 1912

Dr. D. Hopkins,
Washington, D.C.

Dear Dr. Hopkins:

I respectfully submit the following preliminary report of the Hayfork Forest Insect Control Project. This report is based on investigations made the undersigned, assisted by Deputy Forest Supervisor John D. Coffman of the Trinity National Forest.

Location

This project lies in the drainage of the Hayfork of the Trinity river, within the Trinity National Forest. The small settlement of Hayfork lies very near the center of the area.

Area Involved

As a control unit this project should include the water sheds of Hayfork Creek, Big Creek, Carr Creek, Tule Creek and Salt Creek, which lie within the following townships:

Townships 29, 30, 31, 32 and 33, Range 12 West, Mount Diablo Mer.
" " " " " " " " 11 " " " "
" " " " and 32 " 10 " " " "
and a small portion of T2N, " 8 East, Humboldt Mer.

The area is bounded by the mountainous divides which surround these water sheds. It is roughly estimated to include about 257 sections or about 164,480 acres. The timber is practically continuous with that of the adjoining watersheds of

in the Hayfork valley. This was carefully cruised and was found to contain 69 trees, 12 inches and over D.B.H., which would have to be cut in control work. After looking over the remainder of the valley it was estimated that each timbered section would average at least 100 infested trees, 12 inches and over, D.B.H., which would have to be cut to clean out the heavy infestation. As approximately one half of the 22 sections of the valley are open farming land or nontimbered this will make a total of 1100 trees which constitute the worst part of the barkbeetle infestation. Within the limits of the valley it is evident that there has been some acceleration in the amount of dying timber during the last two or three years. It was estimated that in parts of this area from 25% to 35% of the stand of yellow pine has been killed by the insects.

There is a good stand of timber on the slopes above the valley floor and here the infestation of the bark beetle is widely distributed, being very light on some sections and heavier on others. It was estimated that the entire watershed above the valley will average 5 infested trees per section, many of them of large diameters. It is probably safe to cut down the number of sections about 25% to allow for barren land and types where there is very little yellow pine. This will give a total of 900 infested trees.

It will require the cutting and treating of at least 2000 trees on the entire project in order to establish a control area of any protective value. I believe this estimate

of the country about Hayfork are described in Mr. Coffman's report of January 17, 1912. On looking over the valley about the town of Hayfork, one can see everywhere a diseased and heavily infested stand of yellow pine. On the hills above this zone of conspicuous infestation is a stand of Douglas fir, yellow pine, sugar pine, white fir and incense cedar, throughout which can be seen occasional red-foliaged trees.

After looking over the entire area it was found that a satisfactory control unit could not be established on a smaller area than the one outlined above, as the infestation of the barkbeetles is generally scattered throughout the stand above the valley floor.

To determine accurately the amount of dead and dying timber and the number of infested trees on this area would require a careful preliminary reconnaissance of the entire project. This would involve an expense of at least \$800.00, which would be unnecessary unless it is definitely that this work will be immediately followed up by control operations. This reconnaissance was not made, as it soon became apparent that the Trinity National Forest did not have sufficient resources to do more than make a very small beginning at present and that additional appropriations would have to be secured if effective work is to be done.

A rough estimate of the infestation was made as follows:

A tract of 320 acres was selected in section 31, T32N, R11W, MDM., which represented average conditions on the

the adjoining streams.

Ownership

Of the entire area 41,600 acres or approximately 25% is patented. Except for a tract of 4700 acres near the head of Hayfork Creek, owned by Geo.S.Hoxie, near Wildwood, California, the most of the patented land is in small tracts which are held for their agricultural or grazing value. So far as could be determined by this investigation there is little prospect of securing cooperation in control work from the owners of the small holdings. The Trinity National Forest is the owner chiefly concerned in the protection of the standing timber on these watersheds, and it is evident that control will have to be initiated and largely completed by Government expense.

Conditions

This infestation was first reported by Forest Guard O.M.Evans in December, 1911. Later the area was examined more thoroughly by Deputy Forest Supervisor J.D. Coffman. Forest Supervisor W.A.Huestis requested an examination of the area by a representative of the Bureau of Entomology, with the understanding that if it should be found advisable to try to control the outbreak at once with the men and funds now available, the work would be started. This examination was made during the period February 20 to March 1, 1912.

The conditions of the stand and the character

is a decidedly conservative one, and if control work is delayed until next year the number may be very much increased.

The protective value of the area consists of the timber on the slopes which amounts to considerably over one billion feet, B.F. On the valley floor seventy percent of the land is patented and the remaining timber is of no immediate value. The owners of the patented land want this cleared anyhow, and the dying of the timber is in no way regarded by them as a menace.

The timber outside of the valley however is well worth saving. The following table showing the stand on National Forest land was furnished by Forest Assistant Jotter;

FOREST INSECT CONTROL - HAYFORK PROJECT
TIMBER BY M.F.B.M. IN THE
ENTIRE DRAINAGE

UNIT	: DF.	: YP	: SP.	: WP	: RF	: IC	: TOTAL
Big Creek	: 151,709:	24,639:	35,843:	12,441:	557:	1,685:	194,254
Barker Creek	: 34,882:	14,710:	13,037:	5,168:	-	: 1,099:	68,869
Carr Creek	: 58,429:	28,798:	13,200:	1,635:	-	: 237:	75,905
East Fork	: 65,177:	68,922:	22,917:	6,632:	-	: 645:	164,293
Wildwood	: 81,920:	71,595:	33,204:	20,498:	-	: 8,596:	215,813
Upper Salt Ck:	63,674:	63,086:	25,128:	8,097:	-	: 3,884:	163,896
Lower Salt and Tule Creeks	:: 60,000:	60,000:	20,000:	-	: -	: 3,000:	170,000
Total Species:	495,791:	331,750:	161,329:	54,471:	557:	19766:	1053730

*Approximate stand

Cause

One striking feature of the condition of the yellow pine and probably the one which has caused the most comment from settlers and local residents is the red color of

the needles on thousands of the second growth trees. This is described in Mr. Coffman's report as the yellow pine blight. This condition could be seen all over the Hayfork valley, and to a less noticeable extent in nearly every place visited during the investigation: around Weaverville, on the road between Weaverville and Hayfork, along Salt Creek and at the head of Lost Creek. Where the blight was at its worst all needles except those of the past season's growth were dead.

The small red larvae which were discovered by Coffman in the twigs at the base of the needles were found to be plentiful in some of the spotted-foliaged trees, but were altogether wanting in others. This appears to be the larvae of a dipterous insect. At this date these larvae were leaving the little cells in which they were imbedded in the growing bark of the twigs and were forming small puparia out on the needles. Considerable material was collected which we now have at this Station and from this we hope soon to rear the adult flies. After an examination of many trees, I am of the opinion that while these dipterous larvae may cause some deformation of the twigs by severe attack, still they do not directly affect the needles. The injury caused by these larvae does not account for the extensive dying of all of the older needles on the trees. In fact this blight does not appear to be caused by insect attack of any sort. I am satisfied that it is due to a disease, and should be brought to the

attention of the Bureau of Plant Industry so that its extent and seriousness may be determined.

No trees were found during this investigation which appeared to have been killed by the blight alone, but some small trees were found which had been affected by the blight and which had been attacked and killed by the flat head borer, Melanophila sp.

One group of trees, mentioned in Mr. Coffman's report, were attacked only by a species of Ips under the bark. On further examination it was found that the Ips was not primarily attacking these trees as the terminals of nearly all limbs had been previously mined by the larvae of a weevil, possibly that of Magdalis sp.

The larger mature trees on this area are dying from the attack of the Western pine beetle (Dendroctonus brevicornis Lec.) and the flat-headed western hemlock bark borer (Melanophila drummondi, Kirby). There is also a very little of the mountain pine beetle (Dendroctonus monticolae, Hopk.) Any of these three species appear to be capable of making the primary attack or any two may be found in the same tree. The 69 trees, 12 inches and over DBH, which were examined on the sample half section, were examined at the base and showed the following proportion:

Western pine beetle (in some trees the flat-headed borer was also found) - - - - -	29
The flat-headed western hemlock bark borer (no trace of the western pine beetle was found) - - - - -	38
The mountain pine beetle - - - - -	2
Total	69

It was estimated that this ~~same~~ tract contained about 2000 small trees under 12 inches DBH, which were infested by the flat-headed western hemlock borer.

From the standpoint of insect control the western pine beetle, the flat-headed western hemlock borer, and the mountain pine beetle are the only species which it will be practical to consider. The presence of the dipterous larvae in the yellow pine twigs is not of sufficient importance to warrant control operations for this alone, and if the yellow pine blight is a plant disease, recommendations for its control should be made by the Bureau of Plant Industry.

Methods of Control

It will be necessary to cut and burn the bark of a sufficient number of the infested trees to bring the infestation under control. This will have to be done at direct expense as there is no immediate market for the timber. The work will have to be extended through the timber on the entire watershed about the Hayfork valley. Cleaning out the infestation from the valley only will protect no timber of immediate value. This work should be completed May 1.

Approximate Cost

It is estimated that it will require at least \$4000.00 to carry the work to a sufficient degree of completion to protect the water shed. Practically all of the funds will have to be supplied by the Forest Service. The

cost as applied to the few small owners who may be interested in the protection of the timber will be very small. Estimates of these individual costs can only be made by a preliminary reconnaissance and this is unnecessary until it is definitely assured that the Forest Service will go ahead with the project.

Cooperation

The cooperation necessary to carry out general insect control work successfully on this project will be between the Forest Service and the Bureau of Entomology. Some of the small owners may be willing to cut down the trees and burn them as it will help to clear up the land, but it is doubtful if they will be willing to do this during the season suited for control work, and they will not do anything toward protecting the adjacent timber which they do not own.

If the work is done this season it will probably have to be done by the Trinity National Forest without increased appropriation. Supervisor Huestis informed me that he could call in most of his Rangers, and by drawing on his office force could get together a crew of nine men, but his general expense fund was now about depleted and no further aid could be given.

With a Ranger's meeting scheduled in March and the necessity of getting the men back to their districts by the middle of April to get ready for the fire season, it will be possible with the time and men allotted to cut not more than 300 or 400 trees. This will not be sufficient to establish

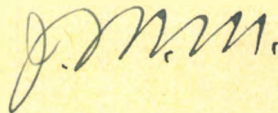
a protected area.

It is probable that if any work is done, the Forest Service will have to secure permission to cut and treat the trees on the patented lands at its own expense.

Special Recommendations

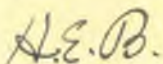
The following plan is recommended:

If the Forest Service agrees to provide the funds for carrying out the insect control work on the entire project, that the Bureau of Entomology assume the responsibility for the advice and give the necessary assistance for working out a preliminary reconnaissance and plan for control; that the Bureau also give the necessary instructions for carrying on control operations.



Entomological Assistant

Approved



In Charge of Forest Insect Field Station 5.